NOISE-PROTECTING ARRANGEMENT FOR EAR PROTECTOR

FIELD OF THE INVENTION

The present invention relates to a noise-protecting arrangement for ear protector. The noise-protecting arrangement includes an audio-frequency receiving unit, a first audio-frequency amplifying unit, a volume control amplifying unit, a current amplifying unit, a gain control signal unit, an impedance matching unit, a gain control unit, a gain adjusting unit, a volume regulating unit, a second audio-frequency amplifying unit, and an audio-frequency output unit to automatically attenuate a noise that enters into the ear protector and is higher than a predetermined dB value, and thereby protects a user's eardrum.

BACKGROUND OF THE INVENTION

Currently, there are many differently structured ear protectors available in the market for protecting users' ears against impairment by noises. However, most of these conventional ear protectors are designed only to isolate noises above a predetermined dB level. That is, when a user wearing the ear protectors works in a noisy environment, he or she is completely isolated

from any external sound having an audio frequency higher than the predetermined dB level.

SUMMARY OF THE INVENTION

A primary object of the present invention is to provide a noise-protecting arrangement for ear protector that is adapted to automatically attenuate a noise that enters into the ear protector and is higher than a predetermined dB level, instead of completely isolating the audio signal, so that a user wearing the ear protector may still hear all sounds in the environment while being safely protected against impaired eardrums.

BRIEF DESCRIPTION OF THE DRAWINGS

The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

Fig. 1 is a block diagram showing a circuitry for receiving audio signals according to the present invention; and

Fig. 2 shows wave shapes generated at different circuit stages of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please refer to Fig. 1 that is a block diagram showing a circuitry for receiving audio signals according to the present invention, and to Fig. 2 that shows wave shapes generated at different circuit stages of the present invention. As shown, the present invention mainly includes an audio-frequency receiving unit 1, a first audio-frequency amplifying unit 2, a volume control amplifying unit 3, a current amplifying unit 4, a gain control signal unit 5, an impedance matching unit 6, a gain control unit 7, a gain adjusting unit 8, a volume regulating unit 9, a second audio-frequency amplifying unit 10, and an audio-frequency output unit 11.

The audio-frequency receiving unit 1 may be, for example, a capacitor microphone for receiving an external audio signal. The external audio signal received by the audio-frequency receiving unit 1 is sent to and amplified by the first audio-frequency amplifying unit 2. The external audio signal amplified by the first audio-frequency amplifying unit 2 is then sent to the

volume control unit 3 for amplification again. The audio signal further amplified by the volume control unit 3 is then sent to and processed at the current amplifying unit 4. The audio signal processed at and output from the current amplifying unit 4 is of 85dB, which is equivalent to an audio signal of 0.6V.

The audio signal of 0.6V so obtained from the current amplifying unit 4 is sent to and received by the gain control signal unit 5, at where the audio signal is processed, converted, and output as a control signal of 0V. When a sound source received by the gain control signal unit 5 is an audio signal less than 85dB, the converted and output audio signal shall be a control signal of 3V.

The impedance matching unit 6 is adapted to receive an audio signal amplified by the first audio-frequency amplifying unit 2, and the received audio signal is matched and given an impedance to reduce audio signal loss thereof.

The gain control unit 7 is a field effect transistor (EFT). When the audio signal received, processed, converted, and output by the gain control signal unit 5 to the gain control unit 7 is a control signal of

0V, the gain control unit 7 is energized for the audio signal amplified by the impedance matching unit 6 to attenuate at the gain adjusting unit 8 and then pass through the volume regulating unit 9. On the other hand, when the audio signal received, processed, converted, and output by the gain control signal unit 5 to the gain control unit 7 is a control signal of 3V, the gain control unit 7 is not energized and the audio signal amplified by the impedance matching unit 6 is allowed to directly pass through the volume regulating unit 9.

The gain adjusting unit 8 is a fixed resistance for adjusting the value of gain of the audio signal attenuated by the gain adjusting unit 8.

The volume regulating unit 9 is a variable resistance for regulating an intensity of the audio signal passed through the impedance matching unit 6, so as to control high and low of volume of the audio signal being output.

The second audio-frequency amplifying unit 10 is used to amplify the audio signal regulated by the volume regulating unit 9.

The audio-frequency output unit 11 is a loudspeaker.

When the audio signal is processed at the second audio-frequency amplifying unit 10, the audio signal initially received by the audio-frequency receiving unit 1 could be heard at the loudspeaker of the audio frequency output unit 11.

With the above arrangements, it is possible to attenuate the volume output of noise to protect a user's eardrum against impairment.